SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

MOSTYN COLLIERY, NORTH WALES.

These coal mines are leased from Lord Mostyn by the Mostyn Coal Company. There are two plants at this colliery—the Eyton Pits and the Mostyn New Pits. The Eyton Pits have been in operation above 40 years, and are 130 yards in depth; one is downcast, from which coal is drawn with an engine of 17-in. vertical cylinder, 3-ft. stroke; the other pit is used solely as the furnace upcast for the whole of the colliery. The upper series of seams are worked out in the Eyton Pits, and at present the lower or Bychton series of seams are being driven to by tunnels from the bottom of the pits.

The Mostyn New Pit is divided into two shafts for drawing coal—part of the way by brattice; the depth is 250 yards. From the large shaft coal is drawn by a 32-in. vertical cylinder, 5-ft. stroke, from the 250 yard level, working direct to the rope-rolls; flat wire-ropes are used, and two cages, each carrying four tubs in two decks. In the little shaft coal is drawn from the 200 yard level by a 25-in. horizontal cylinder, 5-ft. stroke, direct-acting; the ropes are flat wire; two cages are used, each carrying two tubs in two decks. From 300 to 400 tons of coal per day is raised at the whole of the pits. West of the drawing-pit, about 40 yards, is situated the pump-pit, over which is erected a bull pumping-engine, the cylinder of which is, without doubt, the largest in the kingdom. This cylinder is 100 in. in diameter, 14-ft. stroke, 30 lbs. steam pressure, worked expansively, and condensed. It raises water from the depth of 250 yards in five lifts, the two lowest are bucket-lifts, each 18 in. diameter, the three following are plunger-lifts, each 24-in. poles, the upper one delivering at the surface; the engine goes two strokes per minute, day and night; it can go five at its maximum. A wrought-iron balance-beam at the top of the pit is weighted with about 30 tons at its outer end. There are 17 boilers to supply these engines with steam, besides the underground hauling-engine, the steam for which is conveyed down the drawing-shaft in pipes. There are also two capstan engines in connection with the pump-work, working on third motion; the capstan-ropes are iron wire, one of these being 3 in. in diameter.

The Mostyn New Pits have been in operation about 20 years: they are sunk close to the estuary of the River Dee; tunnels are driven from the 250 yard level and from the 200 yard level, under the estuary in each case; these have been extended above 1000 yards northward, across the measures, having a slight fall to the pit, to facilitate the flow of water. The dip of the strata is in the same direction. A hauling-engine, placed in the lower tunnel, has lately commenced to work; it has two 18-in. horizontal cylinders, 3½ ft. stroke, condensing, direct-acting, two 4-ft. drums; it hauls both ways, by means of main and tail ropes in the north tunnel, and also from the dip in two places, with the main rope only. From 40 to 60 tubs, carrying 8 cwts. each, are drawn at once on the tunnel, and eight tubs from the dip.

The seams of coal intersected by the lower tunnel, of a workable thickness, are 12 in number, and in order downwards, as follows; these, with the intervening strata, are all deposited within a depth of about 300 yards:—

	Ft.	in.	
1.—Cannel coal.			
2.—Three-quarter coal	2	6	
3.—Five-yard coal	14	0	
4.—Three-yard coal	9	0	Good steam coal.
5.—Two-yard coal	5	6	ditto
6.—Durbog seam	5	0	Good house coal.
7.—Stone coal.			
8.—Cannel.			
9.—Hard Five-fourths coal	3	6	
10.—Bychton soft Five-fourths	3	6	
11.— ditto Two-yard	4	0	
12.— ditto Three-quarter coal	2	6	Smiths' and coking coal.

The usual dip of the strata is 1 in 2½ northward, but this varies from 9 in. to 2½ ft. per yard. The mode of working the whole of these seams is on the stall and pillar system. A pair of levels or crosses are driven out 3 yards, 8 yards apart, thirled each 20 yards. From the upper level wickets are commenced to the rise, 12 yards distant from their centers; each wicket is gradually widened out to 5 or 6 yards, and pillars of 6 yards wide are left between them; these are thirled every 20 yards, as the wickets are worked upwards. The wickets are worked up in sets of five, the middle one being the jig-brow, on which all the coal is sent down to the cross, and the jig-wheel is moved up 20 yards as soon as new thirlings across the wickets are made. The wickets are driven from the level of the lower tunnel to that of the upper one, giving a range of about 120 yards. The coal does not throw off much gas generally; the Durbog seam is the most prolific in fire-damp. Powder is required to be used for blasting in all the seams. Davy lamps are used solely underground: 56,000 cubic feet of air per minute is circulated through the Mostyn pits. Two large faults are crossed in driving the tunnels; the first is, in fact, three faults of 78, 15, and 61 yards each, within a space of about 100 yards—all upthrow to the north. The second principal fault is an upthrow north about 60 yards. These faults, being all upthrows in that direction, constitute a fresh series of workings in the same seams, in the extension of the tunnels.

The Five-yard seam averages 14 feet of clean coal—not strong. Metal roof is not good; 4 feet of rashes below the coal. The Three-yard seam includes 7 in. of Cannel, which forms a good roof; 9 ft. of hard clean coal, with bones of strong steam coal in it—rock floor. The Two-yard seam averages 5 ft. of clean hard coal; metal roof, irregular; fire-clay below coal—6 in. thick is holed in. The Durbog seam averages 5 ft. of clean coal, used for house purposes, with excellent fire-clay below it. The Bychton Two-yard seam measures—Top coal, 1 ft. 2 in.; shale band, 10 in.; bottom coal, 2 ft.=4 ft. This is also good house coal, of the soft quality. The Bychton Three-quarter seam has a ganister floor, and is the lowest coal found in this field. The whole of these seams are worked on one principle. The proportion of coal pillars left, as before stated, is necessary for the protection of the mine against water, which is quite dry in the furthest and lowest workings.

About 20 years ago a great increase of water was got in the Eyton pits; the flow amounted to 1200 gallons per minute; this has, however, gradually decreased, and now amounts to not more than 400 gallons, principally from the upper workings.

MACHINE COAL-CUTTING PICKS.

Sir,—I am obliged to your correspondent, "An Observer," for giving me credit for some novelty, however small, in the fixing of my loose pick-points; and, assuming that there is no novelty in the idea of making the points removable, it seems to me that the question is whether those who use our pick machines will prefer to use my system, which is a proved success, or any other. I can only add that the title, "An Observer," is so suggestive that it would be fairer to me if your correspondent would sign his own name the next time he condescends to criticise any of my patents. Samuel Firth, M.A.

Leeds, March 29.

DUTY OF CORNISH MINE ENGINES.

Sir,—It was with much pleasure that I saw the remarks of a "Cornish Mine Agent" on this subject in the Supplement to the *Mining Journal* of March 19. This matter should be most carefully enquired into, as it is of immense importance in the economical working of our mines, especially the deeper ones, where the cost of pumping the water forms such a serious item in the expenditure.

Minutely as a "Cornish Mine Agent" has gone into statistics bearing on a part of the question, I do not think he has referred to the greatest cause of the serious decline in the average duty of our engines. I cannot believe that there is a less perfect class of engines in the county now than in 1843, or that our engineers are less able, or pay less attention to the engines under their charge.

Since the publication of Mr. Lean's Statistics the subject has been much talked about in Cornish mining circles. I have heard many of our most able mine agents and engineers express their opinions on the subject, and they agree that the principal cause of the declension of duty is the very inferior quality of the coal supplied by the merchants of the county. I will mention a case in point. At one of the principal copper mines in the Camborne district the worthy purser, who pays great attention to the quality and price of the goods supplied, has been in the habit for a considerable period of importing his own coal, but latterly he had several hundred tons from a neighbouring wharf, when the duty of the engines, which is always carefully reported, *fell off seven or eight millions of pounds* lifted 1 ft. high per 112 lbs. of coal consumed. Of course this led him to resume importing coal, and the duty has since increased to its former average. This is not a solitary case. The fact is generally recognised by independent persons that the engine coal now sold in the county is very inferior; and I would earnestly call upon out-adventurers and independent shareholders in our mines to direct their serious attention to this matter. I think they will find the best remedy in importing their own coal from the pit's mouth. There may not be much difference in the price, but I am confident there will be an immense saving in the unformly better quality of the article.

Perhaps, another reason which somewhat affects the duty of our engines now, as compared with 1843, might be the greater relative number of *perpendicular shafts* then in the county. Mine agents seem to have become convinced of the greater economy of sinking shafts on the course of the lodes (which almost invariably deviate more or less from the perpendicular) rather than vertical shafts with long cross-cuts to reach the lodes. From the smaller amount of friction, &c., in a perpendicular shaft the duty is always greater. But from whatever causes this falling off in the duty arises, I hope the question will be carefully considered and speedily dealt with. T. T.

March 31.

THE SHROPSHIRE MINING DISTRICT—No. II.

Sir,—The lodes in this district vary in their direction, some running east and west, others north-east and south-west. The veinstuff is mundic, quartz, carbonate of baryles, blende, &c. Besides the Snailbeach, the Old Bog Mine is the only one worked to a great depth; even this might, perhaps, be re-opened and worked to a profit with sufficient capital. The late Mr. Dunsford said, in our hearing, that he would undertake to do it with 40,000*l*. The western part of the district, near the East White Grit, and the southern, between the Stiperstones and Longmynd, offer tempting localities for a trial. Should any companies be formed in this district it is to be hoped they will adhere strictly to facts, and not try to press the Snailbeach lodes, or even (save the mark!) the Van itself into their service. The writer has a flaming prospectus in his possession, accompanied by a map, in which the sett advertised is put down next to the Round Hill, and 1½ mile from the Snailbeach, whereas it was at Rorrington, many miles away from both, and in totally uncongenial strata. This mine was worked for several years, and ended, as might be expected, in a total loss of capital. J. B.

LEAD MINING IN FLINTSHIRE.

Sir,—The range of hills of the mountain limestone formation, extending from near Mold, by Halkin, Brynford, Holywell, and to Talargoch, near Rhyl, are all more or less lead-bearing, and lead has been extracted from them from a very early period, commencing with the time of the Romans, who are understood to have worked and smelted lead ore in some parts of this district; and the working of it has been continued in a limited degree to the present century. The Marquis of Westminster is the possessor of immense estates about Halkin and the district. His ancestor, Lord Grosvenor, derived great wealth from the Halkin lead mines; he commenced the great adit level at a point near Flint; this was driven in a cross-cut direction, intersecting many east and west veins, the most productive of all being the Pant-y-Go vein, which developed in a mass of solid lead, and of great breadth, yielding profits for many years to the extent of 80,000*l*. per year and more. The adit level was continued by John Taylor and Sons, his successors in the working of the mines. One of the Pant-y-Go pits is sunk 230 yards to the adit, and the concern is now partially worked under the title of the Deep Level and Halkin Mining Company. The sett is over 2000 acres, leased from the Marquis of Westminster. One winding-engine draws from the deep pit, and another on the opposite side. Another winding-engine draws also from two pits, one in front, another at the side, the pits in both cases being placed some distance apart from the engines. Several other pits have been worked with horse-whims. Great complaints are made of the want of employment for labour at these mines, and in the district. It is argued that if the ground were further explored by driving cross-cuts, and making ventures in the unproved parts of the sett, that good results would follow. When the former productiveness of these mines and its deep drainage are considered, there seems good reason for this assertion. The number of lead mines which have stopped working in this district is a fact very remarkable: whether this is owing to the veins becoming unproductive in the lower strata of limestone, or from great influx of water at certain depths, I am not prepared to say; it is probably, however, due in many cases to the question of water. Many of the pits on the summit of the Halkin mountain and westward are worked by small proprietors, with horse-whims only, the depth of 100 yards being rarely attained without finding water. When greater depth and a better system of mining are established, by sending out cross-cuts to intersect the different east and west veins over a considerable extent of country, there is reason to conclude that lead mining on such a system would be less speculative and more reliable in profitable results than it has proved to be hitherto in many cases. The mines at Milwr, Long Rake, Bryn Gwiog, and others are suspended. Bryn Gwiog is about the deepest pit in the district (230 yards). The flow of water is not great; it is about to commence again under the name of West Pant-y-Go, by a new proprietary.

East from Pant-y-Go are situated the Hendre and Rhosesmor Mines; these are suspended from causes apart from the productiveness of the veins. The Hendre Mines had been worked for 30 years and more to the depth of 100 yards, and were stopped owing to the greatly increased flow of water. The new proprietors in starting erected two very powerful engines, which for pumping capabilities are unexampled in Wales. When these had been brought into operation, and some ore had been worked from the old levels, the mine operations were suddenly suspended, owing to a dispute with the owners of Rhosesmor Mine on the water question, and partly from the death of one of the proprietors. The Hendre Mine has been standing about two years, and little has been done towards its further development, except the erection of the engines and pumping appliances. The intention was to sink below the 100 yard levels, and open out in greater depth. The large Cornish engine—made at Hayle Foundry—is 100 in. diameter in cylinder, 11-ft. stroke, equal beam. A steam-jacket encloses the cylinder; the beam of cast-iron weighs 67 tons, including gudgeons and distance pieces. There are six plain boilers to this engine; the steam pressure was 30 lbs. The engine worked a 24-inch bucket-lift from the depth of 100 yards, 40 yards in length; above this a plunger-lift of 30 in. delivering to the surface, and a bucket-lift of 18-in. diameter also delivered at the surface from the 60 yard level, where additional water came to keep these columns solid. This engine went 10 strokes per minute at its maximum, and at this rate would raise 5500 gallons per minute, or 550 per stroke. The main pump-rods are of pitch-pine, 18-in. square. An engine, 15-in. horizontal cylinder, placed between the pits, was used as a capstan engine, and intended to draw material from both pits; the capstan-rope is iron-wire, 2½ in. diameter. The lower bucket-lift is suspended by similar wire-rope from blocks on the surface. The pumping-engine at the low pit is an 80-in., 10-ft. stroke in cylinder and in the pit. The beam is placed low down near the surface. The cylinder is placed between the two plates of the beam, with piston-rod connected by cross-head to the beam on the marine engine principle. This engine was driven at 12 strokes and more per minute. It worked a bucket-lift from the bottom—100 yards—to the cistern, and one 24-in. plunger, one 18-in. bucket-lift from thence, both of the latter delivering at the surface. At 12 strokes per minute the quantity raised would be 4032 gallons, or 336 per stroke: the maximum effort would thus give 9532 gallons per minute. One of the engines was sufficient to pump the ordinary feeders in dry weather: in winter the feeders amount to 5000 gallons per minute. Owing to accidents and breakages the engines were not often worked simultaneously. There are four plain cylindrical boilers connected to this engine. The Mold and Denbigh Railway passes near Hendre, giving an improved value to the property.

There are three Cornish pumping-engines at Rhosesmor Mines, erected in close proximity, at the different pits. These are all at present standing, owing to disputes before named with the Hendre Mining Company. Preparations are now being made to commence the working of the mines again. The Rhosesmor engines comprise one 45-in. cylinder; it works from the depth of 140 yards; one 9-in. and one 11-in. bucket lift, each from the bottom; one 16-in. plunger, delivers at the surface; two boilers, one single flue and one two-flued. The maximum rate of going was 10 strokes. One 80-inch cylinder, 10-ft. stroke, 9 ft. in the pit; depth, 152 yards. A bucket-lift at the bottom, one 24-inch plunger-lift, delivering to surface; maximum going, 7 strokes per minute. Three boilers, two single and one double-tubed. A 12-inch horizontal engine at this pit, used as a capstan, is intended for raising material also. Capstan-rope 18 in. in circumference. One 70-in. cylinder, 8-ft. stroke, 7 ft. in the pit; two bucket-lifts, both from bottom to cistern, 21 and 18 in. each; two plunger-lifts from thence. 21-in. poles, one delivering at the surface. A large 12-arm capstan and 18-in. capstan-rope. Three plain cylindrical boilers. There are balance-beams on the surface, one to each engine, the weight being at the in-end of the beams, as the pump-rods are too light to raise the water of themselves. The water rises only 30 yards up from the bottom of this pit, showing that there is an outlet for it at that level. The working of the mines was suspended about 12 months ago; about 80 tons of lead was got per month. The produce of silver was 12 oz. per ton of lead, which is the average of mines in this district. East and west running veins are found most productive and regular, but veins run in various points, at right angles and obliquely to these, and seem often to be only branches from those running east and west. Large fissures or locks occur in the veins, more particularly in those running north and south, which are natural water channels, and when these are drained serve as passages for ventilation in some cases.

Another range of hills, of mountain limestone formation, give rise to the mines south of Mold and Hendre, those at Maes-y-Safn, Mold Mine, Fron Fownog, and several others now standing.

From Halkin to Brynford, on the summit of the mountain, numberless pits have been sunk. Many of these are now worked by two or three or more miners co-operating, furnishing both capital and labour. The Gladstone Mine is in 16 shares, and as many proprietors. The sett is 47 acres, and produces calamine, as well as lead ore, both of good quality.

The Holywell Level Mining Company have one pit in operation, divided as a pump-shaft and drawing-shaft. The depth is 128 yards, and 68 yards down to the adit level. The adit is driven principally on a cross-course, about 1¼ mile in length. At the bottom of the engine pit there are levels at 90, 100, 110, and 128 yards from the surface; these are principally on one vein. The pumping Cornish engine is 65-in. cylinder, 8-ft. stroke, equal beam; works two 18-in. bucket-lifts from 128 yards up to the adit=60 yards, both delivering to the adit; and one 9-in. plunger-lift from thence up to the surface, for condenser and for washing-floors. The strata in the pit consists of blue shale, 90 yards; dark blue limestone, lead-bearing, 10 yards; white limestone, lead-bearing, 28 yards=128 yards. The sett is 520 acres, leased from the Marquis of Westminster, Earl of

Denbigh, Sir Pyers Mostyn, and Mr. Cope. A 17-in. beam-engine, on third motion, raises material with one kibble and round wire-rope, and works the crushers. The principal veins run generally in one direction; but this is at a considerable variation from east to west, the joints or those veins running at right angles are supposed generally to run into a main lode on the former course. The appearances in this mine point to a principal vein lying beyond the present levels. The veins, as a whole, run in various directions.

Under the title of the Gorsedd and Celyn Level Mining Company, two setts have been merged into one; this adjoins the Holywell mines. An adit level, about one mile in length, is nearly completed to the pits, which will give an increased value to the combined properties. There are three recognised veins to work upon, and some depth of unworked ground above the adit level.

March 29. MINING ENGINEER.

RHENISH CONSOLIDATED MINING COMPANY.

SIR,—Your correspondent, "A Shareholder," seems, like many others now-a-days, not very well posted in the affairs of the company in which he holds shares. His letter is, it is true, very mild, as if "condemning where he fain would praise;" and I venture to think that if he would carefully go through the whole of the reports he will find further grounds for this favourable feeling. The amount of work done in the mine, the buildings and machinery erected, will bear comparison for the amount expended with any other mine he may be connected with.

Success, however, in mining, as in war, is dependent on many circumstances, which the captain cannot always control. This has been the case with the Rhenish Company. The plan proposed was, as "A Shareholder" correctly states, that "success should not be dependent on one mine," and he admits that at first it was not. The company attacked three, and, as their engineer advised, with intent to conduct the operations with vigour, when, unfortunately, to carry on the war simile, they found themselves attacked by a formidable and unlooked-for enemy, who threatened to cut them off from their supplies, and actually placed them in a state of siege. Need I say that this enemy was the panic of 1866-67, which besieged London itself, and not until 1869 was the siege raised. This great financial crisis occurred within little more than a year after the company commenced working. An event so unlooked for paralysed all commercial activity, and all men sought how best to husband their resources.

The mining operations were, therefore, restricted; and when the water in James Watt proved too strong for the small engine, it was thought most advisable to stop the mine, and wait for better times—the same with the Fahrenberg. The Bliebach has been continued, and the ore-bearing part of the lode has increased in extent (as it goes deeper) considerably on the Christiania lode at the 20—having now ore standing in the bottom for 30 lachters long, worth 2 tons per lachter (nearly 7 ft. English). The ore is now coming in at the 30 lachter level; this lode extends for more than half a mile, and at the east end, or Bliebach, is producing at the 10 large quantities of ore. Such a mine in England would be worth nearer 30,000*l.* than 10,000*l.*, and is but one out of many the company possess. Y.

ROSSA GRANDE MINING COMPANY.

SIR,—The report from this mine for January is of a highly satisfactory nature, the average yield of ore treated for the entire month being 14·51 ozs. per ton, whilst the shaft, the deepest point, is in ore that will produce over 16 ozs., or 2 ozs. per ton, worth 3*l.* 14s. per ounce. So far nothing could be more satisfactory, but the mine has now been in our possession upwards of four years, two and a half of which have been under the present management; and I believe I am only expressing the feeling of disappointment of the majority of the shareholders at so little progress having been made in its development, that, notwithstanding the admitted abundance of mineral, and almost unequalled facilities for extracting it, a miserable total of 155 tons is all that was crushed for the month. This is attributed partly to want of force, but I venture to doubt the judgment exercised, under such a condition, in so working the first good shoot of ore that has been discovered as to drive levels at intervals of 4 and 6 fathoms and in removing the men employed in extending the ends and sinking the shaft to stope the back and bottom as soon as a level is sufficiently advanced. The result of this system is shown in a constantly diminishing monthly extraction.

My object, however, in writing is not so much to find fault as to express a hope that more will be done to explore the quartz lodes, as from every appearance the prospects from them far exceed those from the jacotinga, to which explorations have been chiefly confined; and although Capt. Treloar's anticipations of success from the latter remain undoubted, yet seeing that all these explorations where at all promising have resulted in holing to old workings, and that the jacotinga is much disordered in the western part of the Gongo property, I think the chances in favour of the quartz lodes will be admitted. These latter are now yielding per ton double the average produce of the Don Pedro or St. John del Rey Mines at their richest, and the following extracts from the reports of Capt. Brokenshar, the former manager, will show what may be expected from them should they continue to improve in depth:—

After referring to other lodes in the mountain, both north or below, and south or above, that are being worked upon, he goes on to state that some of them are 30 to 40 ft. wide at the outcrop, and all run out into the valley, which runs southward, nearly at right angles with the direction of all the lodes in the mountain to the east of it, and that "the strata of the whole mountain in which these lodes are embedded appear to be more or less auriferous." "Levels from this valley can be driven in an easterly direction upon one or the whole of the lodes at different heights, and open out an immense field for developing their auriferous value. It will be seen by the section that by levels taken up even at the horizon of rego B (50 or 60 fms. above water level) great backs from 70 fms. to 150 fms. *perpendicular* in height would be obtained for permanent working, while the present surface excavations and proposed shallow levels would be going on for effecting a communication at the same time." No mine, therefore, could be better situated for working, and a few men employed in driving adits on the course of the lodes, as here proposed, would soon test their qualities, and I believe place our shares in a very different position in the market.

AN OLD SHAREHOLDER.

[ADVERTISEMENT.]

VIRTUOUS LADY—BRENTOR—THE QUEEN.

SIR,—"Shareholder," in the Supplement to last week's Journal, gave such a graphic description of the mine, that very little further comment can be required from me. Everything is progressing favourably, but still I must give vent to my feelings, and state that no one can be so disappointed as I am, respecting the time it has taken to explore to new points. I have repeatedly, and from the very formation of the company, given my opinion that it was absurd to suppose we were going to find wealth in the old workings. I started the mine upon the strength of the great and unusually favourable mineral indications, backed by the fact that tens of thousands of tons of copper had been raised above the 20 fm. level. I anticipated that by Christmas last we should commence to sink the shaft deeper, but here was my mistake, as the lower part of the shaft was not much larger than the seat of a common sized chair, which necessitated an amount of labourr, expenditure of cash, and time—the result being, that it is only a fortnight since that we could commence to sink the shaft.

As regards the south lode, it was anticipated too soon, as upon re-dialling, and allowing for a more perpendicular underlie, it is possible that we may not cut it for another 5 or 6 fms., although it may not be more than 5 or 6 feet off. One thing is clear, that it wants no modern philosophical information to admit that the lode will not advance a step nearer to us. We are driving as fast as we can, and must cut it in due course, and I am confident that 99 out of every 100 of the mining men of England would, at least in their hearts, after a thorough inspection of the property, and a careful perusal of my statement of facts and figures, admit that there are 99 chances to 1 that we shall cut the lode rich. Nay, don't smile; I should convert the whole lot of you, and prove that figures have a good deal to do with the matter; and, depend upon it, that until it is proved otherwise by facts, I shall keep to my text—viz., if tens of thousands of tons of rich ore have been raised from above the 20 fm. level upon about 100 fms. upon the course of only one lode, under very primitive and bad management, what may not reasonably be expected, with a sett more than a mile long, five known lodes traversing through it, to say nothing of other lodes that will most likely be found, the shaft down to 100 fms., and the backs stoped upon the lodes. Here is a little compound multiplication table for you, or you can work it out by Euclid, the rule of three, decimals, or even pure logic, and I shall employ my favourite table, check the whole of your calculations by mental arithmetic, and as I generally do with a difficult sum, and whenever I wish to be quite certain, prove it by practice.

I am told by our agents that the crusher will be put in motion by the middle of April, well and good, and, if so, I shall at once see that 500*l.* worth of ore is sent off to the quays and sampled, from discoveries in the old workings.

In answer to "Shareholder," of three weeks since, our annual general meeting will take place on August 15, in accordance with the Articles of Association. If it is particularly desired it can be held in London, but is it not better for it to be held upon the mine? I never hinder our agents from sending reports to the Journal. Perhaps "Shareholder" thinks they have no faith in the mine. I propose that he asks their opinion through your columns. It is quite true that the directors and secretary have no salary, and they desire none until the mine pays dividends. I am willing, in my faith, to give my services gratuitously until this event comes off. However, if "Shareholder" makes any further complaint upon this matter, it is one that can admit of easy remedy.

BRENTOR.—I yesterday received the following letter from Captain Robert Jackson, the agent of the mine:—

Brentor Mine, March 29.—We started the engine on Saturday last; the water is out, and I have set the shaft to be sunk by nine men, at 16*l.* per fathom, stented the month. The lode in the bottom of the shaft is looking well, full 10 ft. wide, composed of mundic, iron, quartz, peach, prian, and spots of yellow copper ore; so, judging from the appearance of the lode, I have every confidence to believe there will be large deposits of copper at a very shallow depth. The character of the lode is very much like I have seen on the backs of large deposits of copper ore in the eastern part of Wheal Friendship. ROBERT JACKSON.

THE QUEEN.—We last week sold about 50 tons of orey mundic; 25 tons fetched 1*l.* per ton, and 25 tons 2*l.* 6s. per ton, and at deeper points it is anticipated that we shall be able to put on, after the mine is deepened and further developed, some hundreds of men, who will break and raise to surface immense quantities of ore and orey mundic, realising an average of 3*l.* to 4*l.* per ton. As for the silver department, I believe it will soon be a marvel of mining history, as Capt. Knott, our agent, who is a first-class silver ore assayer—not a better in England—informs me that the lode, 2 to 4 ft. wide, will average 20 ozs. to 30 ozs. of silver to the ton, and this is apart from the occasional nests, or pockets, of rich silver found. There has actually been discovered on this lode silver ore in lumps of 20 lbs., that has been sold, and procured from the smelters 20s. for every 1 lb. weight. This is no fable; it is a stern fact. Your readers will find that in your columns expressly for advertising I have applied for a competent agent to attend solely to the silver department, conduct the erection of the necessary machinery, and the extraction of the silver by the amalgamating process, as used in the Mexican and other silver mines. Now, let me inform any of the incredulous public that we do not lay the slightest claim to having found the philosopher's stone, and neither do we pretend to suppose that mercury will extract silver out of a brass button; but who can dispute that it is impossible where the silver is as rich in England, or even richer than in foreign countries, for us to employ the same means with success in the mode of extracting it? I want help in the matter; not the help of money, that comes readily enough, but the help of knowledge from some person or persons who from years experience are thoroughly conversant with all the details of a silver mine, as the Queen, apart from its rich copper lodes, is every whit as much a silver mine, and a most valuable one, as ever existed abroad. If there is anything against the amalgamating process, let me hear of it; let us have a calm, rational discussion upon the matter in your columns, and if my ideas are wrong we can go back to the old system, and sell our silver to the smelters; but understand this, that if as little as 10 ozs. of silver to the ton can be made to pay England will attain a zenith of glory; or even 15 to 20 ozs., as I could take any incredulous person many miles south of the Queen, or north, east, or west, and point out to him mineralised matter that will contain 15 to 20 ozs. I certainly know of no place so rich as the Queen; but once get the affair into real practice and there is no doubt other such lodes exist, and in the general search will be found.

The share list of the "Queen" is closed, but I am authorised to state by the original proprietors that 1000 of the fully paid-up shares will be disposed of at 30s. each. This mine is as certain as the Bank of England; it has 5000*l.* in hard cash to be spent upon it, and in the copper department alone, in order to make handsome dividends at an early date, we intend to have a portable engine at once, whilst a large one is erecting, which will take some three months, and increase our get of ore. It will be readily seen what our sure and certain prospects are when I can inform you that the ore and orey mundic which has just been sold, and realised some 80*l.*, came from not 10 fms. deep. Again I say, as regards the silver, I want every information upon the amalgamating process as used abroad, and I shall be far from the greatest gainer by the success of the Queen, as other setts will most likely be brought before the public by the lucky possessors with tens of thousands of pounds premium upon the strength of our zeal and the wealth of our mine; but I will be generous, and add, no doubt the merits of their properties.

In conclusion, without in the least wishing to press the sale of the shares at 30s. each, I would strongly advise their purchase, and I give this advice more for the benefit of the Virtuous Lady shareholders than the general public, as depend upon it you will not find it very long before it will be impossible to buy them at 10*l.* each.—5, *Abbey Mead, Tavistock, March* 31. THOMAS J. BARNARD.

GREAT FRON FOWNOG CONSOLIDATED LEAD MINING CO.

SIR,—In looking over the "Mining Notes from North Wales," in last week's Journal, I see the writer made an error in saying—"The Great Fron Fownog does not appear to be doing much, the men being engaged just now in clearing out the adit level, with a view to loosening the water, and also putting in some ½-in. pipes." I beg to say that we commenced operations on Jan. 1, and since then we have cleared and secured the adit level for 280 yards, but owing to the want of air we have not been able to finish it, but there is not much more to do to complete it up to the new engine-shaft; and as the water in the old engine-shaft above the adit level is going down, we shall be able to finish it in a short time, and at a small cost. We have now five men each stem, who work eight-hour cores, sinking the new engine-shaft, with which we are making very good progress.—*Fownog, near Mold, March* 31. WILLIAM WASLEY, Manager.

TEIGN VALLEY LEAD AND BARYTES MINE.

SIR,—Since writing you briefly as to my trip to these mines I have had a good talk with some of the largest shareholders, and as I have decided to invest with them pretty boldly, the matter seems to grow upon me by degrees. The practical features that have already taken root with me are these—1. There are the mines to be seen, 640 fathoms in length, with the mountain of barytes, a railroad, terminus, and water-power close at hand.—2. The Exmouth Mine, a short distance below (on the same course), has already yielded 126,000*l.* worth of lead ores.—3. Frank Mills Mine, again, a little further down, is now raising 100 tons of rich silver-lead ore, at a profit of 700*l.* per month.—4. About 2000*l.* have already been spent in proving the lodes, and a site thus ascertained for the new and central engine-shaft of the new company.—5. The reports contained in the prospectus from such men as the late Capt. J. P. Nicholls, Captain Cornish, of Frank Mills; Capt. H. Puckey, Par Consols; Capt. W. Hancock, North Chiverton Mine; and Mr. Adam Murray; together with the engineer's plan of these mines, confirm the sanguine enterprise of the present adventurers that they have a certain mine to start with, and are not breaking virgin ground.—6, and lastly. The entire sett and plant being fully secured at a reasonable royalty, I see no reason to repent my venture as one of the shareholders; and the more so as the barytes alone, if properly worked and marketed, ought to turn in cash enough to keep on the work until the lead lodes are again reached by the new shaft, and subsequent drivages therefrom.—*North Wales, March* 31. S. M. R.

[For remainder of Original Correspondence, see this day's Journal.]

AUSTRALIAN GOLD.

The yield of gold in the colony of Victoria in 1869 has been less than in any year since that of the first great rush to "the diggings." In 1868 the colony exported 1,905,942 ozs.; in 1869 the exports amounted to only 1,700,972 ozs. These returns, however, included a considerable portion of gold, the produce of other colonies. In 1868 the quantity of Victorian gold exported was 1,596,058 ozs., and in 1869, 1,340,838 ozs.; but there is not this difference in the absolute yields of the two years. Over 120,000 ozs. of gold, the produce of the year 1867, was kept back, and exported in the beginning of the year 1868, in order to save the export duty, which was finally abolished on Jan. 1 of that year. The net yield of Victoria in 1869, so far as it is possible to ascertain it, was 1,367,903 ozs., or 106,284 ozs. less than the yield of 1868.

Notwithstanding the falling off in the returns, there has been an increase in the number of miners employed from 63,181 in 1868, to 68,037 in 1869. Calculating the gold at 4*l.* per ounce, it will be found that in 1866 the persons engaged in mining averaged 31s. per week; in 1867, 35s.; in 1868, 36s.; and in 1869 within a small fraction of 31s., or about the same as in 1866. The men engaged at the principle mines on weekly wages have received far more than th's. The difference will serve to show the large amount of capital which is constantly being expended, for which, as yet, there has been no adequate return. However, if but a moderate portion of the new leads and lodes which have been lately opened turn out at all well, the present year will, in all probability, tell a very different tale. Some excellent yields were recorded in January from several of the principal gold regions, and Berlin has maintained its reputation as a nugget-producing district. Within the last fortnight of that month a dozen nuggets, averaging from 5 ozs. to 60 ozs. were found in this locality. A peculiarly shaped flat nugget, weighing somewhat over 5 ozs., very pure, and free from admixture of quartz or dirt, was found by a party while digging in some old ground at Little Bendigo on New Year's Day. This nugget formed part of 25 ozs. of gold, the result of the week's washing. A nugget weighing 10½ ozs. was also recently unearthed in Argyle Gully. A recent crushing of 300 tons of quartz from the Pleasant Creek Cross Reef Company's claim, Pleasant Creek, gave a very respectable yield of 861 ozs. 19 dwts., or an average of 2 ozs. 17 dwts. to the ton.

The *Bendigo Advertiser* says:—

"Our metallic resources, which, so far as gold is concerned, are daily becoming more and more perceived to be practically inexhaustible, are in the future to be increased by the addition of various metals, of which silver and zinc are not the least important. Iron ore has been met with in many localities, but hitherto not in quantity sufficient to warrant the erection of smelting-works. Now, however, it is extremely probable that iron will be added to the list of our products, as a very fine band of iron ore has been struck in this neighbourhood, a sample of which, in the hands of Mr. Shiress, assayer for the Bank of New South Wales, has resulted in a fine button or piece of iron, that shows the ore to contain at least 80 per cent. of the metal."

FOREIGN MINES.

FRONTINO AND BOLIVIA (Gold).—The directors have the usual advices from the mines, dated Feb. 15, accompanied by a remittance of 464½ ozs. of gold dust, produce of the mines for January. Mr. Greiff in his report states that the temporary loss is occasioned by expenditure on account of surface work in connection with the construction of the new tramways, mills, &c., and that as far as the various mines are concerned, good results will accrue when these works are completed and attention can be devoted to their continuous working. The following is the account of the cost and produce for the month of January last.—Cost: At Frontino and Bolivia Mines, and expenses in London and Medellin, 1472*l.* 4s. 1d.—Produce: 464½ ozs. of gold dust, from 1593 tons of mineral stamped; average yield per ton about 6 dwts., 104*6l.* 13s. 4d. Loss on month's operations, 425*l.* 10s. 9d.

UNITED MEXICAN.—The directors have received despatches from the Commissioner, dated Guanaxuato, Feb. 21, from which the following is an extract.—Mine of Jesus Maria-y-Jose: The mine since last month shows a slight improvement. The tortas of ore recently sent in have improved in ley, and will yield more than those washed at the end of last year and in January of this year, and now that the political movements in this vicinity have ceased to create so much excitement amongst our workmen, we have more buscones in the mines, and they seem more inclined to attend to their work. The buscon sales for the four weeks ending Feb. 17 amounted to $6187. Some of the buscon workings have improved in the last fortnight.—Mine of Remedios: The workings are carried on with no great change, the yield of ore from week to week being very even. The accounts for January show a profit of $3109, of which $1814 appertain to the company.—New Concern, Adit of San Cayetano: The adit was pushed forward in the month of January 10½ varas. The end now is in mountain rock again, harder than last month, with some quartz running through the greenstone in small veins.—Mine of Buenos Ayres: We have been obliged to suspend work again in the Buenos Ayres shaft to put in some timber and mason work, but on Feb. 19 we reached 137 metres depth. The rock is still vein stuff, but without silver.—Mine of San Antonio de la Ovejera: The shaft has been in very hard rock, but since Feb. 12 we have been getting on a little faster in it. The depth reached on Feb. 19 was 164½ varas.—Mines of San Cayetano and El Diamante: Nothing is doing in these mines except a little work now and then, to keep up the company's rights. In El Diamante one of our workmen a few days ago found on the surface a narrow strip of ore of good ley; of the part belonging to us I will have an assay made. Though the entire quantity will only be about three cargas, it shows that the lode is not barren.

EXCHEQUER.—J. Chalmers, Silver Mountain, Feb. 28: On Jan. 31, 27 feet of side drift and 7 feet of the main tunnel had been accomplished. On Jan. 22 the winze chamber, referred to in my first report, was excavated and timbered, and on the 31st the winze itself (an inclined shaft from the tunnel) had been sunk 9½ feet. During the month of February 32 feet of main tunnel were run, 19½ ft. of air-shaft raised, 15½ ft. of winze sunk and timbered, and 27 ft. of drifts run therefrom for ore. On reaching the 354 the air got so bad that the men could scarcely work—a contingency at that distance not anticipated, and therefore not provided against. It being an utter impossibility to get up sawn timber to make air-boxes, there was no alternative but an air-shaft—this shaft will be about 150 feet deep, and is being raised from the tunnel on the casing of the ledge. Already 19½ feet have been made. Taking into account the fact that the shaft will serve the double purpose of prospecting the ore "chimney" through which it passes, as well as supplying the mine for a long period with air without further expense, I do not see that we have anything to regret in the necessity which has arisen to compel its construction, except perhaps the delay it will occasion in getting under the best part of the "chimney," a little further on. Meantime the men are supplied with air by means of a large bellows and hose. You have already been informed that it was thought advisable, and a saving of money, to put two shifts in the winze. Every day proves this. Three tons of ore have been extracted, which assay all the way from $100 (21*l.*) to $1232 (256*l.* 15s.) per ton (of 2000 lbs.), as advised by my telegram to day. A team has been engaged to take this batch of ore to the English mill at Reno, but the state of the roads has been such hitherto as to forbid the attempt. I think, unless we have more snow, we shall get it off on Monday. Besides this we have out upwards of ⅛ ton of third-class, which would not pay expense of custom working and freight. Since making up the 3 tons for Reno, being anxious to get down to the 100 ft., I have confined the work in the winze mostly to sinking, the extraction of ore consequently being limited to what may be met with within its four sides. This course has been suggested to me by the fact that the shutes of ore are not only getting more frequent, but improve in quality as we go down. Patches of clay even have assayed as high as $487·62 (101*l.* 9s.) a ton, and everything that comes up to the surface is carefully watched and tested. If, however, it is, as I gather from the secretary's last, still your wish to see bullion at periodical intervals, I can run a drift in the 50 and raise on the ore from that level, but I need not remind you that the freight to Reno, $30 (12*l.* 10s.), the custom dues for working, $30 (6*l.* 5s.), the fact that the mill guarantees only 85 per cent. of the assay value, besides the expense of getting ore down to Silver Mountain at this time of the year, together constitute an amount which had we a mill of our own ready on the spot, would be a handsome profit per ton.

PACIFIC.—The directors have advice from their Lander Hill Mine to March 3. I have forked the water below the 550 ft. level, and commenced to drive a cross-cut south; here the ground is favourable for driving. As soon as this level is extended a few feet I shall open out another level west to come under the sump-winze. The lode in the 400 ft. level, west of engine-shaft, is 18 in. wide, producing good stones of ore—a very kindly lode. The lode in the stope in the bottom of the 400 ft. level is looking well; the lode is 2 ft. wide, of excellent quality quartz; here the ground is hard for progress. The stope in the back of the 400 ft. level is not so good as it has been, but still producing some good quartz. I hope to begin crushing the beginning part of next week, and will telegram the results as early as possible. Everything is pushed on as fast as it can be to make a return.

PESTARENA UNITED.—T. Roberts, T. Warne, March 25: Peschiera Mine: The stopes in the bottom of the 70 yield 10 tons of ore per fathom, and worth 1 oz. 5 dwts. of gold per ton. The stopes in the back of the 16 fm. level yield 8 tons per fathom, worth 10 dwts. of gold per ton. We continue to meet with small branches of ore in the 65 fm. level cross-cut west, and the ground shows strong indications of being near the lode. Good progress has been made towards freeing the 46 fm. level of the large quantities of rock deposited there during the last three months. The whim-buckets work satisfactorily in the new piece of shaft.—Aquavite Mine: No change has taken place; we intend, however, to commence new stopes next month.—Surface: The water has increased in the Anza river, which has enabled us to start a few other mills of Pestarena. All other surface operations are carried on as usual. At this place we have yet 2 ft. of snow.—Val Toppa: The end north at Marmo Rosso level has improved, and so has the end south in No. 2 level. In the end driving south on the side lode in No. 3 level we have a change of ground with an increase of ore. All stopes continue to yield their usual quantity of ore.

CAPULA (Silver).—Pachuca, Feb. 25: The net proceeds from the silver, 182 marcs 3 ozs., produce of 153 cargas reduced in San Diego hacienda, amounted to $1629·21. By the conducta that left here on the 23d inst. we sent to Mexico 371 marcs 2 ozs., produce of tortas Nos. 4 and 5, of 15 montones each, reduced in Jesus hacienda. The assay was 14 marcs, and it yielded nearly 12½ marcs. There was a heavy loss of quicksilver, that has brought up the maquala to nearly 41½ per monton. We shall finish sending to the Jesus hacienda this week sufficient for torta No. 6, of 15 montones, and should the arrieros or fleteros come next week, we shall very soon send another such quantity for torta No. 7. The Mine: The ground in San Pablo cross-cut is without alteration, but getting out a great deal of water. We are only short about 2 varas to intersect the lode. The water has not yet sunk anything in San Miguel winze, neither has it gone down in Guadalupe winze, since my last. The lode in San Henrique end has improved very much; there are spots of ore all over the end, which is 2 varas wide. The greater part of the lode is still to the north. The lode in the Esperanza has also a better appearance; the ground is still very hard; present price, $45 per vara. We have resumed the rising in San Jorge, and I am happy to say the lode has improved very considerably. The stopes to the west are still looking well, but to the east they are poor. We have two stopes to the east of La Bomba. It appears that the dip of the metal is from west to east. I trust that we shall cut the lode in the bottom cross-cut in less than a month, and drain all the winzes, when we shall, of course, increase the extraction.

NEW WILDBERG.—Capt. Sanders, March 25: East Mine: The drivage east at the Erbstollen is, I am pleased to say, improving as we advance, and will yield at present 1¼ ton of ore per lachter.—Carter's Shaft: The drivage at the 70 Erbtiefstergang Erzkammer remains as last week, worth 1 ton of ore per lachter, and the stope 1¼ ton per cubic lachter. The rise and stope above the 60, towards Johanne's sink, are worth 1 ton of ore per cubic lachter. The stopes above the 50, on Dornergang Erzkammer, are also worth 1 ton of ore per cubic lachter.—Beck's Workings: The stope above the 60 remains as last week, worth 1¼ ton of ore per lachter.—Blumengang: The stopes in this part of the mine are much the same as for some time past, and yielding their usual quantity of ore per lachter. The 60 drivage west is yielding work for the dressing-floors, and is worth about ¾ ton per lachter.—West Blumengang: The 60 drivage east is yielding good stones of ore, the part of the lode carried with the drivage is worth 1½ ton per lachter; the ground at present is somewhat disordered, but I believe when we get into settled ground the lode will be more productive. There is no change to notice in any other part of the mine, the tribute pitches continue to yield their usual quantity of ore.

CAPE COPPER.—The directors have declared a second interim dividend of 15s. per share, payable on April 9, on account of the profits of 1868 realised to this date. In order to provide means for effectively working the greatly enlarged field of operations presented by the recent discoveries at the company's mines the directors have resolved to recommend to the shareholders an issue of 5000 new shares with 7*l.*, paid at a premium of 7*l.*

RHENISH CONSOLS.—G. Sweet, March 29: Christiania: The end driving west on the south part of the lode, in the 30 lachter level, is looking better, and affording good stones of lead ore; we are hoping to see an important improvement at this point very shortly. We have been able to do but little to the sinking of the winze in the bottom of the 20, the ground being too full of water, but we trust the 30 end will shortly drain it, when sinking will be resumed. The lode in the bottom will afford 2 tons of lead ore per lachter. The other points in operation are unaltered.—Bliebach: The drivage west, on the north lode, in the 10, is spotted with lead, but not enough to value. A stope west of No. 3 winze will afford 15 cwts. of lead ore per lachter. A stope in the roof of the adit level, on this lode, will afford 1 ton of blende and 10 cwts. of lead ore per lachter. Nos. 1 and 2 stopes, in the roof of the 10 lachter level, on the middle lode, will afford respectively 1½ and 1¼ ton of lead ore per lachter.—Madonna: During the last fortnight we have experienced a hindrance in the mine, by being obliged to overhaul the engine, and have a new piston-ring and spring, and repair the boiler. This is now completed, and the cross-cut from the bottom of the engine-shaft will be hastened on as rapidly as possible, and we trust to intersect the lode in three weeks from this date.

GUERRERO.—J. H. Petherick, Feb. 19: My experiments have at least assured me that there is gold in all the river, and I am already finding ground which promises to be very good between Mineral Alvarez and Ajuno, where, although the race, or artificial channel, which is progressing rapidly, has not drained the pay gravel in the river, I have obtained good prospects on the bank (Alvarez side), and shall commence dry diggings there on Monday, the 21st inst., in addition to the river works in progress alongside. At present I have only two quartz mines at work, one near Patambo (San Martin), where I am sinking a perpendicular shaft to cut the lode at about 30 varas deep, and where I hope to meet good metal; we are down 10 varas, and are sinking about 2 varas a week, by two men, at 4 reals per day each. I am also driving a socabon, or adit, on the course of a vein, which I have traced from a rich mine in the Esperanza pertinencias, across the river into the Alvarez grant, below Ajuno. The mine from which I have traced it by dialling is in gold ore, but the vein on which I am driving appears to be getting into silver, opening into a strong lode 1½ vara in width; it is being driven by two men, at 4 reals per day each. We are getting along very comfortably, and have no sickness. My pioneer staff, who, so far, have been satisfied with very small remuneration, begin to think that present promising appearances justify them in the expectation of fair salaries. My special courier, Capt. Glummer, has returned from his mission to General Alvarez, who received him well, and has sent to all his friends and the authorities near, requesting them to afford us every assistance and protection. I hope now in a few weeks to be making steady returns of gold from the alluvial, and thus, in less time than I stipulated for, to demonstrate that you may safely extend your basis, and find profitable employment for almost any amount of capital. On the whole, considering my various little difficulties at starting, everything here wears a most encouraging aspect for the company.

WEST CANADA.—F. Williams, March 1: Huron Copper Bay: Stephens's winze, sinking below the 35, west of Palmer's shaft, is looking a little better; the horse of wall rock appears to be again getting smaller, and we hope soon to see the last of it; it now yields over 2 tons of ore per fathom. The stope below the 20, east of winze, still yields fully 2½ tons of ore per fathom. The stope below the 20, west of Palmer's shaft, yields 3 tons of ore per fathom. The stope below the 35, east of shaft, has turned out badly, and we have suspended it. The stope below the 20, west of Powell's, still yields 2 tons of ore per fm. The stope over the 35, east of Bray's, yields 3½ tons of ore per fathom. The stope below the 35, east of shaft, yields 2½ tons of ore per fathom. The lode in this stope has fallen off in value considerably of late; we hope soon to see an improvement. The stope over the 35 yields about 2 tons of ore per fathom. The 50, west of Palmer's, has been driven through about 9 ft., and with no sign of the south wall yet. The part of the lode already driven through looks very well, and yields over 3 tons of ore per fathom. We have now put six men in this end, and have increased the hands in Stephens's winze, sinking below the 35 to the west of this, so as to open up the ground as quickly as possible. At the 60 we have put the men to cross-cut south of Palmer's shaft. We are strongly of opinion that there is more lode to the south, and we are hoping to meet with a continuation of the bunch of ore at the 50 at this level also.—Wellington Mine: The stope east of Rowe's shaft yields 3 tons of ore per fathom. The stope west of the shaft yields 2½ ton per fathom.

[For remainder of Foreign Mines see to-day's Journal.]

GREAT SILVER MINES IN NEW MEXICO.—Messrs. Brown and Arnold, two prospectors, lately arrived in this city with the news that they have discovered silver mines of great richness in New Mexico, near the Arizona boundary, and three miles from the line of the Southern Pacific Railroad. The country in the vicinity is good, with abundant wood, water, grass, and some fertile land. It is also in the heart of the Apache country, so that no small party can venture to the place with safety. Mr. Brown had seen the country several years ago, and he was confident there were rich mines there. He left here on Dec. 31, and on Feb. 2, while protected by a military escort, they found

a large and very rich deposit of silver ore. One mass of it is 3600 feet long, 1000 ft. wide, and it projects 1000 feet above the level of the surrounding country. It is apparently a solid body of argentiferous quartz. In another place there is an excavation of 300 feet long, 10 feet wide, and 25 feet deep; but it may have been deeper, for the sides seem to have caved in. There is also an old stone house in ruins, supposed to have been built by the Aztecs. The ore consists of blue and black sulphurets of silver, some of it assaying as high as $2000 per ton. The prospectors brought 70 lbs. with them to San Francisco. They organised a mining district, elected a recorder, and took up claims.—*San Francisco Alta.*

THE NEW EXPLOSIVE—HOW "DUALIN" IS MADE.

Wood of soft texture—for instance, pine or poplar—is reduced to small grains, resembling sawdust, treated with diluted acids, and then boiled in a solution of soda. After having been thoroughly dried, by a quick drying process, the cellulose is mixed with—

No. 1.—Nitre and nitro-glycerine; or,

No. 2.—Being first changed into nitro-cellulose, by being treated with nitric acid (48° B.) and sulphuric acid (66° B.), it is then mixed with nitro-glycerine.

No. 3.—The dried cellulose is mixed with anhydrous glycerine, until the mass becomes of the consistency of thick broth. This is gradually treated to a bath composed of a mixture of sulphuric acid (66° B.) and nitric acid (48° B.) of eight to ten times its quantity, during which process the greatest care must be taken to stir the heated mixture, and cool it. The stirring is continued for at least half-an-hour, after which the mixture is placed in a water-bath of ten times its quantity. The acid water being repeatedly drawn off, and replaced by pure water, the mixture is now placed in a bath of diluted soda-lye. In this it is stirred from one to two hours, again washed in pure water, and then rendered anhydrous by means of hot-water heating, and treating it with concentrated sulphuric acid and chloride of calcium. After having been rendered anhydrous, it is mixed with cellulose, prepared by process described under Nos. 1, 2, or 4, until a dry and not very greasy powder is obtained. The dust is sifted out, and this, if packed into cartridges, is serviceable.

No. 4.—The cellulose is charred, finely pulverised, boiled in concentrated nitre-lye, and, after soda has been added, is rapidly dried, and mixed with nitro-glycerine or dualin, prepared by process No. 1, 2, or 3.

No. 5.—The process of preparing nitro-starch, another ingredient of dualin, is also new. It will prevent the formation of lumps after the starch has been subjected to the acids, and also render the dried preparation less sensitive to dampness.

a.—Starch is thoroughly dried until it assumes a yellowish-brown colour. It is then finely pulverised, and mixed with anhydrous glycerine. The mass is slowly placed in a mixture of nitric acid (48° B.) and sulphuric acid (66° B.) of ten times its quantity, during which process the greatest care must again be taken to stir the mixture, and cool it. The stirring is continued for half-an-hour, when the mixture is placed in a water-bath. The acid water being repeatedly drawn off, and replaced by pure water, the mixture is now placed in a bath of soda-lye, then placed in another water-bath, and finally rendered anhydrous by means of hot-water heating, and treating it with concentrated sulphuric acid and the chloride of calcium. It is now pressed through a fine sieve, and mixed with either dried pulverised starch that has been treated with nitre-lye, or it is mixed with cellulose, prepared as above described, until a dry and not very greasy powder is obtained.

b.—After the starch has been dried it is mixed with pulverised cellulose, or with the dualin-dust prepared by process No. 3. This mass is then placed in a mixture of nitric acid (48° B.) and sulphuric acid (66° B.), and for the rest treated as described by process No. 5.

No. 6.—In an analogous manner mannite is mixed with anhydrous glycerine, and compounded with the other ingredients of dualin.—*Scientific American.*

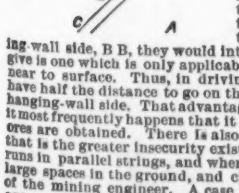
The Royal School of Mines, Jermyn Street.

MR. WARINGTON SMYTH'S LECTURES.

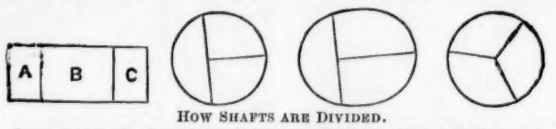
[FROM NOTES BY OUR OWN REPORTER.]

LECTURE XXXIII.—There are no points connected with mining (said Mr. SMYTH) on which the judgment of the engineer requires a greater degree of exercise than that of placing the principal and auxiliary shafts, and the mode in which they should be sunk; but here, as in so many other things, there is a wide difference between a metallic mine and one for coal and ironstone. In the matter of coal, a great many considerations come into play which do not arise in metalliferous mines. The dip of the bed or beds is a matter which often occasions considerable varieties of working, and then, in deciding upon the depth to be first reached, a good deal depends upon the number of years for which the lease or the right of working is taken. Suppose we had to deal with a square tract, which is known to contain coal, it may be of primary importance to know how it lies. It is then usual, if no clue is obtainable from old pits or natural exposure of the rocks, to ascertain by boring across it what the dip and general direction of the beds are. To do this may require a whole series of borings, but two or three will probably suffice. This depends a good deal on the magnitude of the area, and the importance of the mineral to be worked. Supposing there be three parallel beds of coal of equal value—one at 100, another at 200, and a third at 300 yards deep, and your lease is but for 21 years, it would be absurd to sink to the deepest bed: and as to the others, it would be a matter of calculation so to place the shafts as to take out as large an amount of coal as will be most consistent with the terms of the lease. If the length of the lease be greater, then deeper shafts would be sunk, and used with a view to a larger amount of get; but in selecting the site other considerations must also be taken into account. Thus, if there be a main line of railway near, or a canal, or a navigable river, or the sea shore, or any other advantage of transit, something which is not in itself unimportant may have to be postponed out of consideration to these more easy ways of loading the material for the market. Otherwise an entire series of engineering works may be needed for the purpose of bringing the material down to such a point of discharge at a very great cost. Thus, in the North of England there are many excellent coal properties which would not be paying concerns were it not that they have a good and cheap outlet for their produce in this way. Before, then, any engineer begins to open out his works upon a piece of mineral ground he must determine what means of outlet he will have, for without that he cannot fix on the best place at which it is desirable to sink the shafts. He might have to pay a heavy royalty or mileage for a way over private lands; and the direction that way would be allowed to take so as to involve the least annual cost should have an influence also as to the position in which the shaft should be placed. Bargains are, however, most frequently made which enable the adventurers to work the whole of the estate on the payment, perhaps, of a simple royalty, and the course then pursued is to sink at the deepest place from which the whole may be conveniently worked, and to put down the deepest pit there and then, at a little distance, the raising shaft. It will next be a question whether these only should be trusted to, or whether there should be in addition a ventilating shaft, which is generally placed on the rise. These are circumstances which ought to be well looked to at the beginning of the work. A certain seam being known to exist, the question is one simply of economy, how best to get down to the seam, and how best to work it out so as to get a certain number of tons per annum. What makes the question of shafts so important is the cost—oftentimes enormous—of sinking, lining, and tubbing them. An ordinary shaft, in not unusual ground, and not more than 50 fms. deep, may cost from 5000*l.* to 10,000*l.*; at greater depths the cost is not unfrequently 40,000*l.* or 50,000*l.*, and sometimes cases occur in which it is even more than that. Taking the requisite machinery also, there are two or three collieries in the North of England in which the shafts have not cost less than 100,000*l.* to 150,000*l.* And in metalliferous mines, where the work to be cut through has been of unusual hardness, as, for instance, many forms of granite or killas, the cost of a moderately deep shaft will be from 15,000*l.* to 25,000*l.* It is, therefore, a most serious consideration, as if the shaft should be sunk in the wrong place, and the case should necessitate its being carried to so great a depth, it will be impossible to calculate the loss which may ensue. Indeed, the capital and courage of a company could hardly be expected to hold out against such enormous expenses in the face of uncertainty of success in the end.

Whether a shaft should be perpendicular, or more or less inclined—I am speaking of metalliferous mines—is a question to be decided not only by the circumstances of each case, but it is a good deal affected by the custom of a district. Thus, in Hungary perpendicular shafts prevail, while in Cornwall inclined shafts are the more numerous. The Cornish system has grown out of the fact that the shaft itself is there exploratory in a majority of cases, and follows the vein itself from the outcrop, so that every fathom in that way is carefully examined. Sometimes there is but little choice in the matter, as, for instance, in the case of a well-known mine on the banks of the Tamar, where the valuable mineral deposits lie under the river. At the same time, when the dip and direction of a lode are known, and the appearances are good, it is better to sink a perpendicular shaft to the deeper part of the lode, from whence the mineral is raised to the surface by a shorter route than if the shaft were on the lode. In this latter case the sinking must either be on the hanging-wall side until the vein is intersected on the footwall side, and then by cross-cuts driven through dead ground the vein is reached, and no doubt in either case there will be considerable expenditure and loss of time before anything at all is seen of the lode, or obtained from it—an objection which often leads to the sinking being on the lode itself, as at every foot there is a chance of taking out something towards paying expenses. It is surprising, however, that some miners, and particularly in Ireland, should so often prefer to sink on the footwall side of a lode, A A, as it is obvious when the lode dips at any considerable angle, the deeper they go the further they will be from the lode, C, and the greater distance they will have to cross-cut to get at it; whereas by sinking on the hanging-wall side, B B, they would intersect it without a cross-cut. The reason they give is one which is only applicable where the productive levels are tolerably near to surface. Thus, in driving to intersect the lode at D, they would only have half the distance to go on the footwall side, as compared with that on the hanging-wall side. That advantage grows less the deeper the shaft descends, and it most frequently happens that it is only from considerable depths that the best ores are obtained. There is also a further most important consideration, and that is the greater insecurity existing on the hanging-wall side where the lode runs in parallel strings, and where a great portion has to be removed, leaving large spaces in the ground, and creating dangers which tax the best energies of the mining engineer. A case of this sort in Cornwall, only a week or two ago, resulted in a lamentable catastrophe.



With respect to the form and dimensions of shafts, there is great variety. If we go into the stratified districts of England and Scotland we shall find them generally circular, and that for the purpose of presenting an equal resistance on all sides to the pressure of the measures, and as we have seen lined with brick or stone work when dry, and tubbing when wet. Circular shafts are not usually more than from 7 to 12 ft. in diameter; but there are some in Staffordshire through which large volumes of air have to be passed, as much as 15 to 20 feet. Under these circumstances a strictly circular form is not the most convenient, and we often see shafts divided. When cutting a winze, or in beginning a shaft, it is necessary to divide the opening into two parts—one for a down current, and the other for an up current, so that the workmen at the bottom may have fresh air, and these divisions are called bratticing. In some parts of Wales colliery shafts are elliptical, 22 ft. in length, and from 12 to 16 ft. across. They are then divided, and each division used for particular purposes.



HOW SHAFTS ARE DIVIDED.

In most of the foreign mining districts, in Pembrokeshire, and other parts of South Wales, and in some districts of Scotland, the rectangular form is preferred even for collieries, and being divided is thus set apart for different purposes, such as for ladder ways, pumping, and other machinery for raising the mineral. The dimensions of shafts vary a good deal according to custom or local notions. In districts where mining is carried on without much capital, and by a few miners joining together, the shafts are miserably small. In Somersetshire there are old shafts to be seen like wells, and not much more room in them, so that it is almost impossible to deal with machinery in them, or to pass sufficient quantities of air through them. And so in other metalliferous districts they will be found no more than 4 ft. square, with, perhaps, a lining to be taken off that. Little old shafts of this kind are found, too, in districts where lead mines on a small scale are carried on by the men themselves, having in them a ladder on one side, and a bucket raised by a windlass on the other. But where workings are carried forward on a proper scale, shafts are seldom less than 4 ft. across, and 6 ft. in length for the ordinary drawing purposes. If it is to serve for an engine-shaft and pumping-rods, and also for ladders, it must be not less than 11 ft. in length by 5 ft. across in the clear—that is to say, within the timbering or stonework by which it is secured. Indeed, larger dimensions are often a great advantage, and thus in some they are as much as from 18 to 22 feet in length. These exceptionally large shafts, however, most frequently occur in the Hartz and Hungarian mines. In Belgium and other parts of the Continent the shafts are polygonal, and have from 10 to 20 sides, 16 being the most common. In Mexico they are invariably eight or ten-sided, partly for convenience and partly to enable them to work on each side the mule whims they use for the purpose of raising the material.

PROMINENT INVENTIONS, AND WHAT THEY SUGGEST.—In a valuable and interesting paper upon this subject, read before the Inventors' Institute by Mr. G. Henry Cole, the remarkable manner in which one invention suggested another was pointed out; and it was urged that if every inventor were compelled to permit the free use of his invention at a royalty of 2 per cent. fixed by law it would be to the advantage alike of the inventor and of the public. Inventors generally would seek to perfect a promising invention, as so small a royalty as 2 per cent. would make the efforts to produce close imitations not covered by the patent unprofitable. The inventions taken for illustration were Bessemer's Steel Process, in connection with which it was urged that he would have arrived much sooner at satisfactory and useful results had he been permitted to use any previous invention at 2 per cent. fixed royalty; Blake's Stone-Breaker, the patent for which it was stated would be infringed by any invention for crushing in a hopper; and Warsop's Aéro-steam Engine, which was referred to as a very suggestive invention, inasmuch as it gave rise to the question whether it was really the air that produced the marvellous economy claimed for the invention. An animated discussion followed the reading of the paper. The CHAIRMAN (Mr. F. W. Campin, barrister-at-law), thought that the Inventors' Institute could not be better employed than in reviewing inventions, and making known their importance to the country at large. The paper they had heard read was one which they must all feel to be of considerable interest. It would raise discussion at almost every point, for whilst it was evidently the intention of the writer to ensure an inventor an adequate remuneration for his ingenuity, he feared that the mode in which it was proposed to give him that remuneration would be distasteful to a very large proportion of the inventive classes. He fancied that inventors were given to going to sleep upon many questions which affected them as a body, although he by no means accused them of going to sleep about their individual inventions when they considered they had something that could be turned to advantage. The last sentence of the paper was one with which they would all agree—that inventors were of the greatest possible benefit to their country. But whilst he agreed with the paper generally, there were some points which were certainly not in accordance with his views. The idea of cutting every man's advantage down to a 2 per cent. royalty was, he thought, preposterous, for he believed that, perhaps, the greatest inducement for a man to invent was the speculative character of invention—the knowledge that, although he might invent several things which barely repaid him for his outlay, a single success was the passport to an enormous, and sometimes almost fabulous, fortune. If it were the intention of the writer that the percentage should be subsequently fixed, and that 2 per cent. was mentioned only as nominal, he could agree with him, for the proposition of compulsory licenses at fixed royalties was one with which many inventors cordially agreed, but for many inventions 2 per cent. would be altogether inadequate. As to the suggestiveness of invention, he might say that it quite accorded with the views of Sir David Brewster, though not exactly with his own—he thought that it was not one invention developes another, or in other words, that although they might assist men, yet they did not act as spontaneous suggestions, and that the resemblance was merely accidental. Blake's Stone-Breaker resembled the old nutcrackers, no doubt, but it did not follow that the inventor had taken them for his model. The crusade against patents had been attributed to the claims of persons not inventors, and there was, probably, some truth in that view, but it had in certain cases been decided in our courts of law that the quantum of merit should be ascertained by the utility of an invention.

Mr. BELL GALLOWAY believed that there would be some difficulty in adjusting the 2 per cent. Users would, no doubt, give the 2 per cent. willingly enough, but unless it was very much used that would never pay the inventor; and the question was whether it would be sufficiently used to pay him. He thought inventors would often be in a dilemma, but he hailed the opportunity which the paper afforded for him to make the first assertion publicly that the aéro-steam engine was his invention. He was prepared to prove that the invention of atmospheric air process in connection with the generation of steam belonged to him; and the fact of its not having been before developed afforded an example of the difficulties under which inventors laboured in getting their inventions introduced. He took a patent in 1865, and if his patent of Jan. 7, 1865, were referred to, it would be seen that his statement was fully borne out by facts. He had paid the 50*l.* fee upon the patent, and, therefore, retained his rights. He carried the invention further than Mr. Warsop, and was not going to prove a saving of 47 per cent. only. To obviate friction he would force in cold atmospheric air with the steam, and carry it to as great an extent as possible. He did not think they would get the same result by sending back, as was suggested in the paper, the exhaust steam, but that was a matter they would not at present discuss. He wanted it to be understood publicly that he claimed the invention; at the same time, he wished to give all credit to Mr. Warsop, who had worked it to the development, and he would like to show the world that inventors were not enemies to each other. He believed that those inventions based upon natural laws were always the most successful; and he hoped the time would come when invention and inventors would have a better prospect—a complete recognition of their rights.—A VISITOR feared the meaning of the writer of the paper had been somewhat misunderstood; it was, no doubt, intended that the 2 per cent. should be paid by all users of the invention, so that really one inventor would be receiving his 2 per cent. royalty from a dozen different classes of users, each distinct from the other; consequently he would, in the aggregate, be very amply remunerated.

Mr. SAVAGE (of the Workman's Exhibition, 1870) hoped the arguments in the paper would receive the attention to which they were entitled; much matter of great importance was put forward very clearly. It must be remembered that the inventor has often to create his own market, and in the event of any legislative action an effort should be made to recompense an inventor according to his merits. He did not think that a man should be robbed of his invention, although it might be merely a suggestive invention, but they must not ignore the practical man—the man who gives the invention a practical shape. The 2 per cent. would be paid by all, and thus if the working man could by his practical knowledge make the invention of still greater practical utility to the public he should be permitted to do so upon payment of a small fixed royalty to the inventor, who would thus be benefited rather than otherwise.—Mr. R. M. LATHAM thought there would be great difficulty if they were to limit inventors to 2 per cent.; they ought rather, he thought, to recognise the maxim that "The labourer is worthy of his hire." To say that a man who invents a railway or an electric telegraph should be classed with the inventor of a useless machine or process was, he considered, absurd, and he took it that a fixed royalty of 2 per cent. would be most unsatisfactory.—Mr. COLE contended for a fixed royalty, though not necessarily of 2 per cent.; he thought, however, that the smaller the royalty (of course assuming it to be sufficient to remunerate the inventor) the greater would be its money value to the inventor.—Mr. LATHAM could not help thinking that much depended upon the nature of the invention. A quarter of 1 per cent. would sometimes pay the inventor, whilst sometimes 10 per cent. would be insufficient. In a conversation which he had had with the late Mr. R. Roberts, of Manchester, and he told him that it had taken him 10 years to introduce each invention—to offer him 2 per cent. in return for that amount of labour would be most unjust.—Mr. SAVAGE doubted whether with the 2 per cent. royalty system in force it would take long to introduce any useful invention, and 2 per cent. would be quite enough for a maker to pay, as in the aggregate it would be much more. Take a steam-engine, in which there would be, perhaps, three or four distinct inventors to pay, so that 6 or 8 per cent. in all would be paid to inventors. He thought, too, that there was no objection to classing the inventors of important machinery or processes with the inventors of trifles, as each would be recompensed according to value and utility, and would thus obtain a proportionate reward. He believed that if Howe could have secured 2 per cent., as suggested, upon his sewing machine invention he would have made an immense fortune instead of what he did.—Mr. LATHAM feared the 2 per cent. would benefit the rich capitalist against the poor inventor.—Mr. SAVAGE dissented.—The CHAIRMAN, in conclusion, observed that many lapsed patents were not absurd patents, but had lapsed because the inventors had not the facilities, as had been the case with Mr. Galloway, to carry them out. Yet no manufacturer goes to the Patent Office, and adopts lapsed patents, the fact being that in order to get an invention adopted you must act at once as a missionary and as an aggressor. At present you could not get on without money, and it was by appealing to the cupidity of manufacturers that large fortunes were made by inventors. There was a too general impression that patents did not pay, the fact being that although it was comparatively few who made enormous fortunes by inventions the majority of inventors made a very fair profit out of their patents. As to compulsory licenses at fixed royalties, the question was well worthy of discussion, but he saw no reason to single out inventors from the entire commercial world, and to compel them alone to be contented with a fixed profit.—The usual complimentary votes terminated the proceedings.

Meetings of Public Companies.

ECONOMIC LIFE ASSURANCE SOCIETY.

The annual general court of proprietors was held at the offices, New Bridge-street, Blackfriars, on March 26,

Mr. HENRY BARNETT, M.P., in the chair.

Mr. GRIMES (secretary) read the notice convening the meeting.

The following statement of accounts for the year ending Dec. 31 was submitted:—

GENERAL ACCOUNT.

Received—Assurance premiums	£225,402 5 3		
Less commission	7,886 19 3	= £217,515 6 0	
Interest on investments	111,183 14 6		
Less income tax	2,646 19 7	= 108,536 14 11	
Registration fees		58 15 0	
Balance		2,298 16 4	
Total		£328,409 12 3	
Paid—Assurance claims		£247,856 14 0	
Annuity claims		2,319 1 3	
Policies purchased		13,295 10 0	
Re-assurance premiums		324 16 4	
Office expenses		11,727 19 10	
Law charges		976 11 10	
Medical fees		250 19 0	
Ready-money bonus		51,658 0 0	
Total		£328,409 12 3	

ASSURANCE FUND.

DR.—To balance, Jan. 1, 1869, consisting of—			
Funded property	£ 539,013 2 5		
Mortgages	1,744,185 0 4		
Loans on policies	134,650 10 0		
Reversions	113,144 1 4		
Life interests	60,321 7 2		
Office premises	13,921 0 0		
Cash on hand	13,296 14 3	= £2,618,531 15 6	
Profit on revisions fallen in		7,494 6 3	
Total		£2,626,026 1 9	
CR.—By terminable annuities		£ 1,843 16 3	
Balance, Dec. 31, 1869, consisting of—			
Funded property	£ 511,496 10 0		
Mortgages	1,740,089 5 5		
Loans on policies	139,100 10 0		
Reversions	111,545 19 2		
Life interests, &c.	60,596 19 8		
Office premises	13,921 0 0		
Cash on hand and on deposit	45,133 4 11	= £2,621,883 9 2	
Balance from general account		2,298 16 4	
Total		£2,626,026 1 9	

STATEMENT FOR THE YEAR 1869.

Number of proposals received	634
Policies issued	515
Proposals declined	61
Not completed	58
Number of policies remaining in force at end of year	9,682
Amounts assured thereon	£8,042,990
Absolute bonus	907,405
Total liabilities	8,950,395
Sums assured by new policies	409,353
Amount of new premiums	13,492
Total premium revenue	232,954
Invested capital	2,621,883

STATEMENT OF CLAIMS ACCRUED.

On 239 policies, assuring 184 lives in the sum of 293,233*l.*, including bonus.

Out of the 239 policies determined by death, 224 assuring 200,609*l.*, carried 68,724*l.* bonus, averaging 34·3 per cent.

The CHAIRMAN said, before he referred to the figures showing the general state of the business of the office, he wished to state that soon after the last annual meeting the directors found, with great regret, that the health of Mr. Downes, the actuary, was considerably impaired, and, anxious to give him an opportunity of recovering his strength, he was granted a leave of absence for several weeks. After that period Mr. Downes at first appeared able to attend to his duties with entire satisfaction; but subsequently, knowing the great importance of perfect accuracy in all their calculations, the board came to the conclusion that they must find a successor, and they were fortunate in securing the services of Mr. Fisher, who had for some time acted as assistant actuary to the Crown Assurance office—a gentleman well known in the insurance world, and who, it was felt, would reflect lustre upon the establishment. They had also elected Mr. A. W. Peel, M.P., for Warwick, a director, feeling that his name and ability would be a valuable addition to the board. He need hardly say that the circumstances which occurred during the latter part of last year were likely to adversely affect the business of this office, as, indeed, the business of all insurance offices. It was found that after the declaration of a bonus, which was a sort of advertisement for five years, the public flocked to them to secure the next bonus; and this was the case with them to a certain extent, but when in August the Albert Insurance failed there came a sort of panic throughout the insurance world. The result to that society did not prove so much a matter of surprise to those conversant with the principles of assurance as those who, unfortunately, suffered by the failure. The panic showed itself in their case by the diminished number of proposals made to them for some little time after, and some of their policy holders, struck with an amount of alarm, without making enquiry into the position of the society, sold their policies at the society's value. The figures subsequently submitted by the directors showing the relative value of the assets over the liabilities seemed to produce its good effect, for in the months of November and December people flocked in to insure their lives in greater numbers than at any previous period. In spite of those exceptional circumstances, the progress they had made had been highly satisfactory. They had issued new policies to the number of 515 against 445 in 1868. The amount assured by those policies was 409,350*l.* against 383,730*l.* in 1868, showing an increase of 25,000*l.*—none of that was re-insured. The new premiums were 13,492*l.* against 12,521*l.* in 1868, an increase of 970*l.*, and that was above the average of the previous five years. The total premiums received during the year amounted to 231,406*l.* against 228,833*l.*—a net increase of 2572*l.* Last year a number of persons took their bonus in the form of reduction of premium. The total revenue was 348,800*l.*, and the interest on their investments was 117,000*l.* The total number of policies in force was 9682, assuring the sum of 8,043,000*l.*, and bonus in reversion 907,000*l.*, but during last year by death policies lapsed and bonuses which they gave in ready money—or in reduction of premium—they extinguished no less than 553,000*l.* of their liabilities, although, on the whole, their liabilities had increased, because they had taken larger additional assurances. The claims were not so satisfactory—he must confess that they had to face an upward state of things in that respect. The claims accrued in 1869 were 224,000*l.*, carrying bonus besides to the amount of 68,700*l.*, and in 1868 the claims were only 198,000*l.* They were 65,000*l.* more than they had expected, but he did not look upon that with any alarm, because they must expect fluctuations in that item. On the whole, during the last twenty years the claims had been 153,000*l.* less than they expected, and up to the present time of this year the claims had been exceedingly light. The average rate of interest on their investments was 4*l.* 8*s.* 10*d.* per cent. The company had purchased the building they were in for 13,921*l.* The board had taken the question of the payment of commission into their serious consideration. They had been in the habit of allowing 5 per cent. commission on the premiums, which he thought was nothing but what was fair, but to solicitors and persons who were not the recognised agents of the society the board had determined to pay 15 per cent. commission on the first year's premium on policies with participation of profits, and 10 per cent. on all other policies, and to continue to allow 5 per cent. to regularly appointed agents. He then moved that the report be received and entered on the minutes.

Sir ALEXANDER DUFF GORDON seconded the proposition.

The CHAIRMAN, in reply to a question, stated that the directors had declined to give solicitors bringing business any exceptional commission.

Mr. BOWLEY thought the Economic Society would have a still larger business than it had were its condition better understood by the public. Their rates were far below those of any other office in existence, and they knew they had a large bonus accruing on policies of long standing, and they had something like 3,000,000*l.* to meet their assurances. If these facts were better known to the public, instead of any panic among insurance offices adversely affecting the Economic it would, no doubt, have a contrary effect, by considerably increasing its business. (Hear, hear.) He expressed his perfect satisfaction with everything that had been done, but he did wish more means were taken to make the general public aware of the exact position of the society. (Hear, hear.)

The CHAIRMAN said that, considering last year was their bonus year, and that various insurance offices had failed, producing a sort of panic, the Economic had done very well; and the more especially when he believed there had been a general considerable stagnation in that class of business during the last year; but he looked forward with hope to better things, and an increase of business. As to their investments, they were entirely intact, and everything had been properly vouched. As to the calculations upon which their business was based, Mr. Fisher was quite satisfied as to their perfect correctness.

After some further discussion, the motion adopting the report was put and carried unanimously.

Mr. EDMONDS proposed a resolution to rescind the determination of the board with regard to the reduction of the payment of commission, which was negatived; as was also another proposition, to alter the day upon which general meetings are held.

A vote of thanks was passed to the Chairman and directors for the satisfactory manner in which they continued to conduct the society's business.

Thanks were also voted to the secretary and actuary.

The usual compliment to the Chairman for his presidency on the occasion closed the proceedings.

[For remainder of Meetings see to-day's Journal.]

BORING BY MACHINERY.—Mr. R. G. FORD, proposes to make the steady bar telescopic, the pipe in which it works being secured to a screw-clip, sliding backward or forward on the cylinder. This pipe is provided with a sliding-bar, having centre point and screw, adjusting-box, jamb, nut, leather washer, cotter, cotter holes, a feather and slot, and a feather. In using the steady bar the screw-clip can slide either backward or forward on the cylinder, and be tightened in any position with a screw, or the bar can be slid out or in the pipe secured with the jamb nut against the leather washer.

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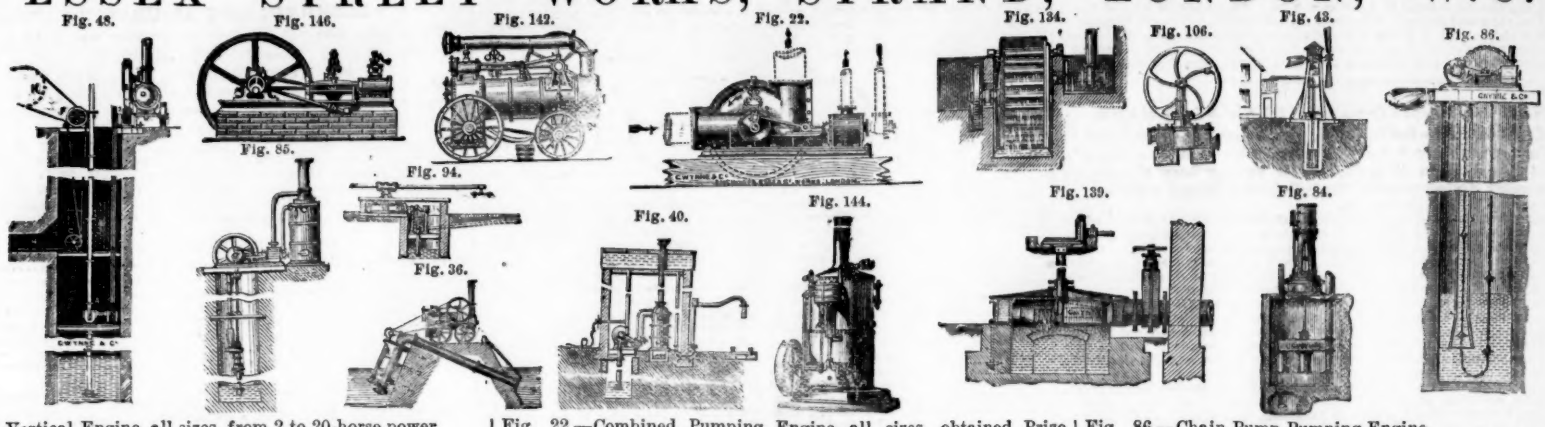

Fig. 144.—Vertical Engine, all sizes, from 2 to 20-horse power.
Fig. 146.—Horizontal Engine, from 4 to 100-horse power.
Fig. 142.—Portable Engine, from 2½ to 30-horse power.
Fig. 40.—Gwynne and Co.'s Combined Stationary Pumping Engine.
Fig. 139.—Turbine Water-wheel, from 1 to 300-horse power.
Fig. 22.—Combined Pumping Engine, all sizes, obtained Prize Medal, Paris Exhibition.
Fig. 85.—Deep Well Pumping Engine, all sizes.
Fig. 134.—Water-wheel Pumping Machinery.
Fig. 36.—Gwynne and Co.'s Patent Syphon Drainage Machinery.
Fig. 95.—Horse-power Pumping Machinery.
Fig. 86.—Chain Pump Pumping Engine.
Fig. 48.—Deep Mine Centrifugal Pumping Machinery.
Fig. 84.—Double-acting Vertical Pumping Engine.
Fig. 106.—Gwynne and Co.'s Improved Plunger Hand Pump.
Fig. 43.—Wind Power Pumping Machinery.

Steam Engines of all kinds and sizes, Hand and Steam Fire Engines, Water Wheels, Hydraulic Lifts, Cranes and Jacks, Steam and Water Valves, Hydraulic Presses, Sheep Washing Machinery, &c., &c.

List of Centrifugal Pumps, two stamps. Illustrated Catalogues of Pumping Machinery, six stamps. Large Illustrated Catalogue, with many Estimates, &c., twelve stamps. All post free. GWYNNE and Co. have recently effected a considerable reduction in their prices, being determined to supply not only *the best* but *the cheapest* Pumping Machinery in the world.

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CHAPLIN'S PATENT PORTABLE STEAM ENGINES AND BOILERS.

PRIZE MEDAL, INTERNATIONAL EXHIBITION, 1862.

STATIONARY ENGINE, From 1 to 30-horse power. No building required.
PORTABLE HOIST, 1 to 30-horse power. With or without jib.
STEAM CRANE,* 30 cwts. to 20 tons. For wharf or rail.
CONTRACTORS' LOCOMOTIVE, 6 to 27-horse power. For steep inclines and quick curves.
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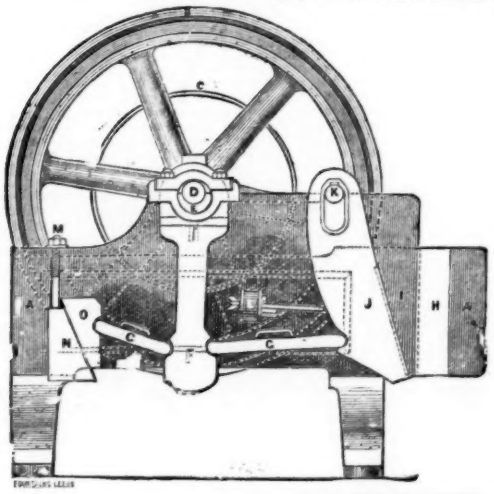

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